

## CLAIMS

1. A device for dithering a three-color source image, comprising:
  - a first logic for dissecting a color space of said source image into a plurality of tetrahedrons each having four vertices;
  - a second logic for locating one of said tetrahedrons that contains a point corresponding to a value of a pixel of said source image;
  - a third logic for generating a random number as a threshold value for dithering said pixel of said source image;
  - a fourth logic for assigning a probability density corresponding to each of said vertex of said located tetrahedron;
  - a fifth logic selecting a vertex as an interim output provided by said threshold value through an inverse probability distribution function derived from said probability densities of said vertices; and
  - a sixth logic for locating an output point in an output color space corresponding to said selected vertex.
2. A device for dithering a source image according to claim 1, wherein said first logic that dissects said color space further comprises:
  - a first logic for truncating said value of said image pixel of said source image, for locating a 3-dimensional cubic subinterval containing said point; and
  - a second logic for further dissecting said 3-dimensional cubic subinterval into a plurality of tetrahedrons.
3. A device for dithering a source image according to claim 1, wherein said logic for generating a random number is a 2-dimensional array of pseudo-random numbers overlaying on top of said source image.



1 10. A method for dithering a source image according to claim 9, wherein said method that  
 2 dissects said color space comprises the further steps of:  
 3 truncating said value of said image pixel of said source image, for locating a 3-  
 4 dimensional cubic subinterval containing said point; and  
 5 further dissecting said 3-dimensional cubic subinterval into a plurality of tetrahedrons.

1 11. A method for dithering a source image as recited in claim 9, further comprising the steps  
 2 of:  
 3 converting an input colorant value into said pixel value through one-dimensional lookup  
 4 tables, prior to said step of locating a tetrahedron.

1 12. A method for dithering a source image according to claim 9, wherein the step of  
 2 generating a random number includes the step of fetching a pseudo-random number from a 2-  
 3 dimensional threshold array overlaying on top of said source image.

1 13. A device for dithering a source color image via weighting coefficients associated with a  
 2 plurality of sample points in a source color space of said source color image, comprising:  
 3 a first logic for generating said weighting coefficients of said sample points, wherein said  
 4 weighting coefficients are probability densities of said sample points;  
 5 a second logic for generating a random number as a threshold value for dithering a pixel  
 6 value of said source image;  
 7 a third logic selecting a point from said plurality of said sample points provided by said  
 8 threshold value through an inverse probability distribution function derived from said weighting  
 9 coefficients of said points; and  
 10 a fourth logic for locating an output point in an output color space corresponding to said  
 11 selected point.

1 14. A device for dithering a source image according to claim 13, wherein said logic for  
 2 generating a random number is a 2-dimensional threshold array overlaying on top of said source  
 3 image.

